

**LANDFILL ASSOCIATES
HAMDEN, CONNECTICUT
CERCLIS NO. CTD084798289**

**Final Site Inspection Prioritization
December 1, 1998**



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STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106-5127**

Site Inspection Prioritization Report
Landfill Associates
Hamden, CT
CERCLIS No. CTD084798289

INTRODUCTION

The following Site Inspection Prioritization (SIP) report complies with the requirements set forth under the EPA Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended. The SIP represents a site screening process set forth by the National Contingency Plan (NCP). It does not necessarily fulfill the requirements of other State and Federal regulations such as RCRA. This work is being completed under Connecticut's Multi-Site Cooperative Agreement (MSCA) with EPA.

A site reconnaissance was conducted on-site by CT DEP Water Management Bureau personnel on June 26, 1996.

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SITE DESCRIPTION

The Landfill Associates site is located at 2891 State Street (Route 5) in Hamden, CT (see Figure 1- Location Map). The geographical coordinates of the site are N41° 21' 25" latitude and W072° 53' 13" longitude (1). The site consists of two parcels of land owned by Mr. Joseph J. Farricielli and identified by the Hamden Tax Assessor as parcel A (Map 2332, Lot 014) and parcel C (Map 2432, Lot 020) with a total acreage of approximately 76 acres (2). The most recent permitted landfill operation on site was Q Park Landfill, operated by Quinnipiac Group, Inc. (Q-Group), a solid waste disposal area which was permitted to accept bulky wastes on approximately 26 acres of the site (3). For reasons discussed below, the site has been listed on the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and the "CT Inventory of Hazardous Waste Disposal Sites."

The site is located in an area of industrial zoning east of State Street (Route 5). There is mixed residential zoning to the west of the site. A solid waste disposal area known as the "Tire Pond", also owned by Mr. Farricielli, abuts the site to the north. The site is bounded easterly by the Quinnipiac River and southerly by Brick Yard Creek. An active rail line forms the western boundary of the site. The nearest residence is located approximately 750 feet west of the site (see Figure 1- Location Map) (4).

Site access occurs from a private road running east from State Street (see Figure 2- Site Map). There is a fence located adjacent to the railroad line along the western boundary of the site. Site access from the other sides of the property is unrestricted. The site is surrounded by earthen berms (flood prevention) on the eastern and southern boundaries of the filled area. The unpaved berm is available to motor vehicle traffic and allows access to the ground water monitoring wells. Due to the nature of site activities all other access roads are temporary and are relocated as needed to the current area of filling. There is a garage for vehicle maintenance located on the western side of the site. A portable office trailer adjacent to a weigh station is located on the eastern side of the site. A brick office building is located near the north boundary of the site.

There are no drinking water wells located on-site. The South Central Regional Water Authority provides potable water in the vicinity of the site. The nearest residential drinking water well is estimated to be located approximately 2.25 miles east of the site in the town of North Haven (4).

According to CERCLIS there are three CERCLA sites within a one mile radius of Landfill Associates. The Resource Conservation and Recovery Information System (RCRIS) lists 21 RCRA Hazardous Waste Handlers in the same area (see Figure 1) (4).

LANDFILL ASSOCIATES

ONE MILE RADIUS

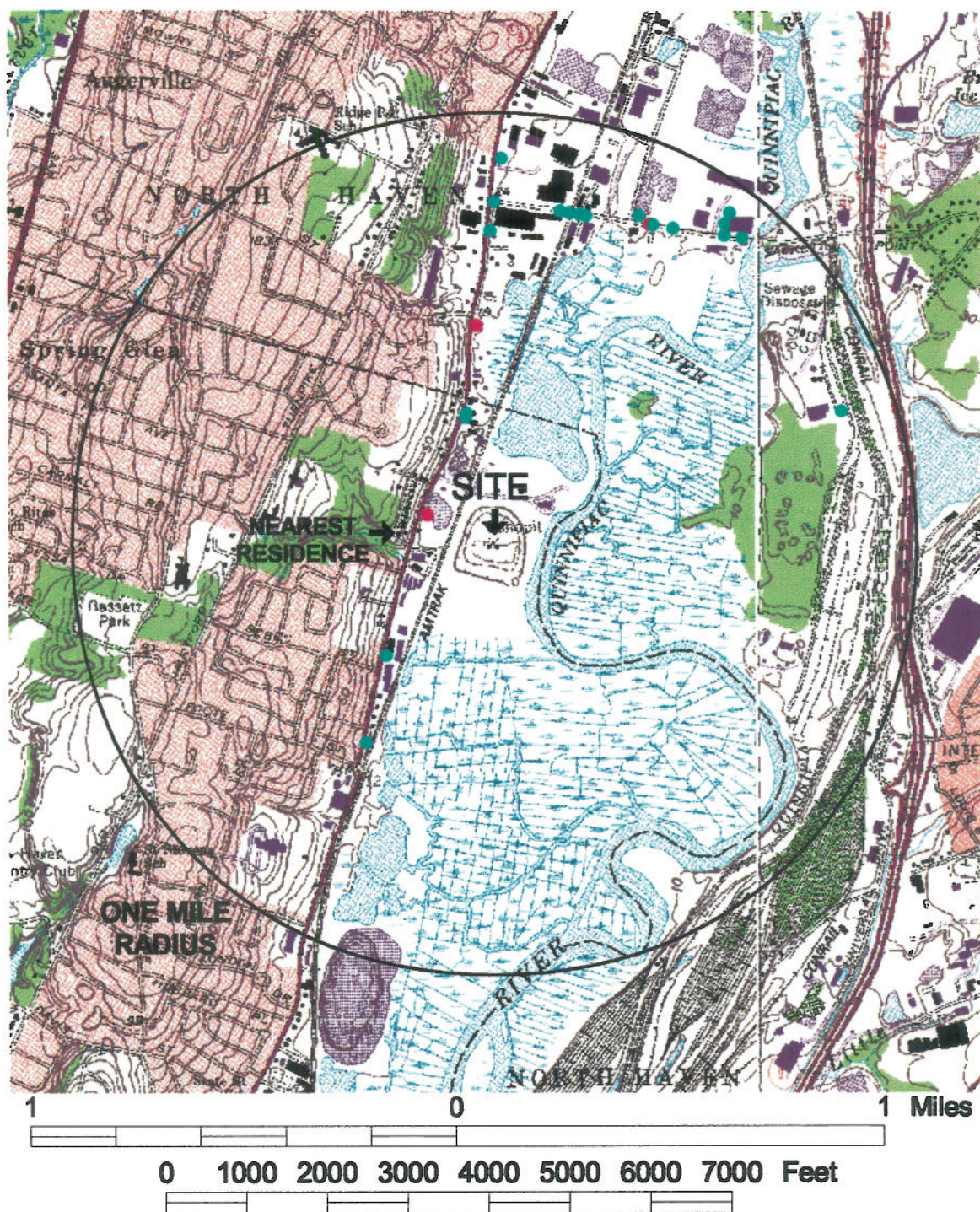


FIGURE1- LOCATION MAP

CERCLIS and RCRIS Sites

● RCRIS

● CERCLIS

BASE MAP IS COMPOSED OF:
 NEW HAVEN, CT 1967;
 PHOTOREVISED 1984
 BRANFORD, CT 1967;
 PHOTOREVISED 1984

QUADRANGLE
 LOCATION





**FIGURE 2- SITE MAP
LANDFILL ASSOCIATES
HAMDEN, CT
1:3600 (1"=300")**

- | | | | |
|--|---------------------------------|--|----------|
| | Flow Direction | | Railroad |
| | Sediment Sample | | Roads |
| | Surface Water Sample | | Wetland |
| | Monitoring Well Sample | | |
| | Property Boundary (Approximate) | | |
| | Perimeter Berm | | |



OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

From the 1950's to 1998 solid waste materials were deposited in an approximately 39 acre depression which was created by historic clay mining. Table 1 presents the ownership history and past uses of the Landfill Associates property (2). The various landfill operations at the site have had a lengthy history of solid waste and permit violations which were discovered during routine inspections and complaint investigations. These violations have resulted in numerous enforcement actions involving several different business entities. Inclusion of the volume of information regarding these matters is beyond the scope of this report. The following paragraphs include pertinent information concerning the discovery of the site, historic sampling of wastes and the most recent status of the site.

Inspections of the bulky waste disposal operation performed at various times revealed that unauthorized disposal of small quantities of hazardous substances had occurred on site. Table 2 presents the known source areas at the site. The site was entered into CERCLIS based upon information received by the Federal Bureau of Investigations that up to 2,000 drums of chemical wastes were disposed of at the Landfill Associates property during the period from 1978 to 1982. The allegations were made by a former Landfill Associates employee in 1983. An extensive geophysical investigation including excavation of detected anomalies (test pits) was conducted by the EPA Emergency Response Team in 1983. This investigation led to the recovery and removal of buried waste materials at the landfill. Analyses of this waste indicated the presence of inorganic elements, acids, volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). A report by EPA indicated that thirty-eight 55 gallon drums and one plastic container were excavated from the property.

The following italicized text is an excerpt from the Final Screening Site Inspection dated August 20, 1991 by NUS Corporation (attached as Appendix A) (1):

The following is a summary of the sampling data available in file information for the Landfill Associates property:

November 24 1971:

The Connecticut Department of Health, Laboratory Division, analyzed a specimen of "trade waste" from the Plasticrete disposal area (the Landfill Associates property) for several water quality parameters and hydrocarbons. It is unclear if the analyzed samples were collected from specific samples of trade wastes or were collected from the general landfill area. Results of the analyses indicated:

- a "considerable quantity" of the following mixed hydrocarbons: acyl acetate, benzene, toluene and xylene;*
- copper at 34 milligrams per kilogram (mg/kg) and chromium at 10 mg/kg;*

"...significant quantities of detergents, toxic metals and solvents, some of which are highly flammable and have an acute human toxicity" (Attachment A) (CT DOH 1971).

May 13, 1974:

The CT DOH Laboratory Division analyzed two samples of unknown industrial waste for general water quality parameters, metals and hydrocarbons. These samples were collected from two "puddles" on the northern area of the landfill. Below are the maximum concentrations detected:

<u>Compound/Element</u>	<u>Concentration</u>
copper	0.45 milligrams per liter (mg/l)
cadmium	1.8 mg/l
nickel	0.35 mg/l
zinc	2.4 mg/l
phenol	350 mg/l

In addition, mixed solvents were detected in each of the collected samples. Their concentrations were only reported as being relatively significant, heavy, or trace. Some of the principle components of these solvents included: acetone, n-butyl alcohol, ether, methyl alcohol, chloroform and 1,2-dichloropropane at a "relatively significant concentration", and traces of carbon tetrachloride, butyl alcohol, toluene, tetrachloroethylene, tetrachloroethane, and xylene. (Attachment B) (CT DOH 1974).

November 4, 1981:

The following table lists analytical results of a water sample (no. 22899) collected by DeCarlo & Doll, Inc. from the outfall discharge at the Landfill Associates property. The Federal Maximum Contaminant Level (MCL) has been included for comparative purposes and does not imply that the water is used for drinking:

<u>Element</u>	<u>Concentration</u>	<u>Maximum Contaminant Level</u>
cadmium	0.016 milligrams per liter (mg/l)	0.010 mg/l
copper	0.07 mg/l	
iron	4.2 mg/l	
lead	0.11 mg/l	0.05 mg/l

Landfill Associates

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nickel	0.08 mg/l
zinc	0.60 mg/l

(Attachment C) (DeCarlo & Doll 1984; U.S. EPA 1990c).

May 26, 1983:

Cascio, Bechir and Associates collected an aqueous sample of "bulk waste discharge" from the Landfill Associates property and submitted the sample to Aqualogic for analysis. The sample was analyzed for several water quality parameters, select metals, ammonia and hydrocarbons. Analytical results indicated the following concentrations:

<u>Compound/Element</u>	<u>Concentration</u>
ammonia	24.0 milligrams per liter (mg/l)
cadmium	0.01 mg/l
copper	0.16 mg/l
chromium	0.02 mg/l
lead	0.10 mg/l

Less than 10 parts per billion (ppb) of pentane, hexane, heptane, benzene, toluene and xylenes were detected in the above sample (Attachment D) (CBA 1983b; U.S. EPA 1990c).

November and December 1983:

The EPA performed sample analyses on leachate, effluent, and drummed material excavated from at least five pits on the Landfill Associates property. Locations of leachate and effluent samples are unknown. Attachment E contains a pit location map, data detailing composition of drummed samples, and analytical data. Analyses of these samples included use of Extraction Procedure (E.P.) Toxicity tests and X-Ray methods. Below are the maximum concentrations detected:

<u>Compound</u>	<u>Concentration</u>
benzene	9 micrograms per liter (ug/l)
chlorobenzene	2J ug/l
ethyl benzene	4 ug/l
toluene	2 ug/l
xylenes	4 ug/l
tetrahydrofuran	120 ug/l

Note:

*J - approximation
(Attachment E) (U.S. EPA 1984b).*

The "Final Effluent" concentration of tetrahydrofuran reported at the Landfill Associates property was 100 ug/l (Attachment E) (U.S. EPA 1984b).

Below are results of analyses from seepage collected from the side of the L2000 pit in the landfill area:

<u>Compound</u>	<u>Concentration</u>	
1,1-dichloroethane	3	micrograms per liter (ug/l)
1,2-dichloroethylene isomers	3	ug/l
benzene	45	ug/l
tetrachloroethylene	4	ug/l
toluene		360 ug/l
ethyl benzene	72	ug/l
xylene	300	ug/l

(Attachment E) (U.S. EPA 1984b).

The following is a description and summary of work performed on materials from the excavation pits:

- Pit A 28 drums (55-gallon) were removed. X-ray analyses of the drums indicated trace concentrations of cadmium. Copper and nickel filings were detected.*
- Pit D Three crushed 55-gallon drums were removed. Two of these drums contained 55 to 92 percent fumaric acid with water.*
- Pit F Six crushed 55-gallon drums were removed. X-ray analysis indicated trace concentrations of cadmium in two of these drums.*
- Pit L2000 One 11.3-liter plastic container was removed. Analyses of material from this container indicated ethyl benzene at a concentration of 10,000,000 ug/l and xylenes at a concentration of 60,000,000 ug/l.*
- Pit L3000 1 crushed 55-gallon drum was removed. X-ray analysis indicated the presence of nickel and copper metal filings.*

(Attachment E) (U.S. EPA 1984b).

November 4, 1987:

Groundwater samples were collected from four monitoring wells (B1 - near the entry gate, B2 - behind a garage, B3 - on top of the dike, and B4 - near "sump dike") and a surface water sample from the sump pump on the Landfill Associates property. A sample location map showing the location of these wells was not included in the file information. These samples were analyzed for inorganic chemicals, VOCs and pesticides/PCBs by Environmental Consulting Laboratory. During this sampling activity, a Quality Assurance/Quality Control program was utilized by Environmental Consulting Laboratory. Groundwater samples were collected in accordance with the Manual of Groundwater Sampling Procedures, NWWA/EPA Series, Section 6. The surface water sample collected was a grab sample. The Quality Assurance/Quality Control samples, inclusive of a blank, a duplicate, and a spiked sample, were also collected during sampling activities. Analytical results indicated that aqueous samples contained concentrations of select metals, volatiles and total phenols. PCBs were not detected. The following summarizes maximum concentrations detected in groundwater and surface water:

<u>Compound</u>	<u>Groundwater Concentration</u>	<u>Surface Water Concentration</u>
toluene	0.084 milligrams per liter (mg/l)	
total phenols		0.014 mg/l
beryllium	0.07 mg/l	
zinc	0.34 mg/l	

Note: Currently, there are no MCL standards for these compounds and elements (Attachment F) (Eber 1988).

April 6, June 22, October 27, 1988:

Environmental Consulting Laboratories analyzed three rounds of groundwater and surface water samples at the Landfill Associates property. Groundwater samples from four monitoring wells and surface water samples from the sump pump on the Landfill Associates property were analyzed for VOCs using EPA Methods 601 and 602. Samples were analyzed for semi-volatile organic compounds using EPA Method 603. The analyses performed in April and June of 1988 indicated no detections in samples collected from groundwater and surface water samples on the property. Sample analyses from October 1988 indicated the following concentrations of compounds detected in groundwater samples from monitoring well B1 and surface water samples from the sump pump at the property:

<u>Sample Location</u>	<u>Compound</u>	<u>Concentration</u>
monitoring well B1	1,1-dichloroethane	1.7 micrograms per liter (ug/l)
sump pump	trans-1,2-dichloroethylene	1.3 ug/l

Note: Currently, there are no MCL standards for these compounds (Attachment F) (Eber 1988).

February 1 and 3, 1989:

Samples from monitoring wells MW-1D, MW-2S, MW-3S, MW-4D, MW5S, MW-6D, MW-7S, MW-8S, MW-9S, MW-10S, MW-15B and MW-16D on the Landfill Associates property were analyzed for PCBs, inorganic elements and VOCs by the Environmental Science Corporation. Inorganic elements were analyzed using the E.P.Toxicity test and VOCs were analyzed using U.S. EPA Method 624. The locations of some of these wells are shown on figure 2, but it is unknown where other wells are located or when they were installed on the property. Analytical results of the samples indicated the following maximum concentrations:

<u>Compound/Element</u>	<u>Concentration</u>	<u>Maximum Contaminant Level</u>
acetone	799 micrograms per liter (ug/l)	
benzene	930 ug/l	5 ug/l
chlorobenzene	4 ug/l	
1,1-dichloroethane	13 ug/l	
1,2-dichloroethane	55 ug/l	

<u>Compound/Element</u>	<u>Concentration</u>	<u>Maximum Contaminant Level</u>
trans 1,2-dichloroethene	44 ug/l	
toluene	150 ug/l	
PCBs	4.3 milligrams per kilogram (mg/kg)	
cadmium	0.03 milligrams per liter (mg/l)	

chromium-total	0.30	mg/l	0.05 mg/l
lead	0.42	mg/l	0.05 mg/l

(Attachment G) (Environmental Science Corp 1989; U.S. EPA 1990c).

Samples from MW-4D indicated concentrations of acetone and benzene as well as concentrations of four other VOCs (Figure 2). There is no known attribution as to why groundwater samples from MW-4D indicated overall higher concentrations than samples collected from other wells.

October 1990:

Fuss and O'Neill, retained by the Quinnipiac Group, collected groundwater samples from monitoring wells MW-8S, MW-9S, MW-10S and MW-4D at the Landfill Associates property. These samples were analyzed for general water quality parameters, inorganic elements and VOCs. The U.S. EPA Methods used are not known. Analytical results indicated the following maximum concentrations:

<u>Compound</u>	<u>Concentration</u>	<u>Maximum Contaminant Level</u>
benzene	1.0 micrograms per liter (ug/l)	5 ug/l
tetrachloroethylene	1.0 ug/l	
chlorobenzene	2.5 ug/l	
1,3-dichlorobenzene	1.4 ug/l	
sodium	537 milligrams per liter (mg/l)	
chloride	594.1 mg/l	
barium	1.02 mg/l	
ammonia	16.7 mg/l	
cadmium	0.01 mg/l	0.010 mg/l
chromium-total	0.02 mg/l	0.05 mg/l
zinc	0.09 mg/l	

(Attachment H) (Foster 1990; U.S. EPA 1990c).

Also in 1990, surface water samples were collected from a location adjacent to the Landfill Associates property (Q-Park Site). These samples, collected during high and low tides, were analyzed for general water quality parameters. Analytical methods used are not known based on available file information. Analytical results indicated the following concentrations:

<u>Compound</u>	<u>Concentration</u>
sodium	617 milligrams per liter (mg/l)
ammonia	0.46 mg/l
chloride	952.6 mg/l
barium	0.06 mg/l
zinc	0.02 mg/l

(Attachment H) (Foster 1990)

Prior to September 1996, Q-Group accumulated 200 piles of bulky waste shredder fines on the surface of the landfill. Tests performed on the fines revealed that the fines contained asbestos or asbestos-containing material (ACM) at levels greater than 1% in all piles tested (see Appendix C). Q-Group did not have written authorization to dispose of ACM. A consent order was issued October 2, 1996 (SW-380) requiring Q-Group to, among other issues, remove and dispose all ACM. Q-Group did not comply with the consent order (3).

S&H Industries (S&H) leased the site and intended to apply for the appropriate permits and ultimately reopen the landfill. A consent order (SW-388) was issued on May 9, 1997 wherein S&H agreed to fulfill the obligations of Q-Park in removing and disposing all ACM. S&H is out of compliance with the consent order (3).

At least one half foot of cover has been applied to the areas of the landfill where ACM materials had been present at the surface. Landfill operations are currently being conducted by the owner, Mr. Farricielli, without a permit to operate a solid waste disposal area. Further enforcement actions are being pursued by the DEP Waste Management Bureau

**TABLE 1
OWNER/OPERATOR HISTORY**

PERIOD	OWNER(S)/OPERATOR(S)	SITE USAGE
1860s- 1960s	STILES & SON BRICK COMPANY/SAME	CLAY MINING & BRICK MANUFACTURE
1960's- 1976	PLASTICRETE CORPORATION/SAME	CLAY MINING & BRICK MANUFACTURE
1968	PLASTICRETE CORPORATION/PORTION LEASED TO A CONTRACTOR	DEMOLITION DISPOSAL
1976- 1981	JOSEPH J. FARRICIELLI; PLASTICRETE CORPORATION/LANDFILL ASSOCIATES	BULKY WASTE DISPOSAL
1981-1984	JOSEPH J. FARRICIELLI/LANDFILL ASSOCIATES	BULKY WASTE DISPOSAL
1984	JOSEPH J. FARRICIELLI/LANDFILL ASSOCIATES, HAMDEN BUILDING SALVAGE	BULKY WASTE DISPOSAL
1984- 1990	JOSEPH J. FARRICIELLI/HAMDEN SALVAGE	TRANSFER STATION
1990- 1997	JOSEPH J. FARRICIELLI/QUINNIPIAC GROUP, INC./(S&H INDUSTRIES lessee)	BULKY WASTE DISPOSAL
1998- Present	JOSEPH J. FARRICIELLI	LANDFILL- OPERATING W/OUT PERMIT

**TABLE 2
SOURCE EVALUATION**

POTENTIAL SOURCE AREA	CONTAINMENT FACTORS	SPATIAL LOCATION
Landfill area	None	39 acres (see Figure 2)

Table 3 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the property:

**TABLE 3
HAZARDOUS WASTE QUANTITY**

SUBSTANCE	QUANTITY OR VOLUME AREA	YEARS OF USE/ STORAGE	YEARS OF DISPOSAL	SOURCE AREA
Various solid wastes including demolition debris, ACM and unknown quantities of hazardous substances	Unknown	1950's- present	1950's - present	Landfill area

GROUNDWATER PATHWAY

Prior to use as a landfill, areas within the Landfill Associates site were used for clay mining with the resulting pit utilized for waste disposal (the bottom elevation of the filled materials is below the water table). Surficial geology of the site historically consisted of surficial swamp deposits overlying lake bottom sediments which are described as New Haven Clay (5). The New Haven Clay consists of silt, clay and fine sand which is stratified in parallel layers varying from a fraction of an inch to two inches.

The bedrock geology of the site consists of New Haven Arkose which is described as pinkish, gray, brown, and reddish arkosic sandstone and conglomerate, with interbedded layers of reddish siltstone. Depth to bedrock in the area of the site is mapped as varying from west to east at least 50 to 200 feet below the surface (6).

Groundwater in the area of the site is classified as GB (description of classification given in Appendix B). Groundwater flow direction is presumed to be southeasterly toward the Quinnipiac River and Brick Yard Creek; however, the direction will likely vary due to tidal influence.

Part of the following Connecticut towns are located within a four mile radius of Landfill Associates: East Haven (population 26,144), Hamden (population 52,434), New Haven (population 130,474), North Branford (population 12,996), and North Haven (population 22,247) . There are no active public wells located within four miles of the site (4).

The South Central Connecticut Regional Water Authority (SCCRWA) distributes drinking water to 383,623 customers in the greater New Haven area. SCCRWA owns two wells constructed in overburden, identified as Mount Carmel Wells #1A and #2, located 3.8 and 3.9 miles north of the site respectively (see Figure 3- Four Mile Target Radius). Both wells are maintained annually as standby supplies to supplement peak water consumption in the summer. The wells were last utilized to contribute water to the distribution system in 1994. The combined safe yield (if actually utilized) for the wells is 1.9 million gallons per day (mgd) which potentially accounts for 3% of the maximum safe yield of the entire SCCRWA system (64.8 mgd) (7). Table 4 presents the estimated population served by the wells.

LANDFILL ASSOCIATES

FOUR MILE TARGET RADIUS

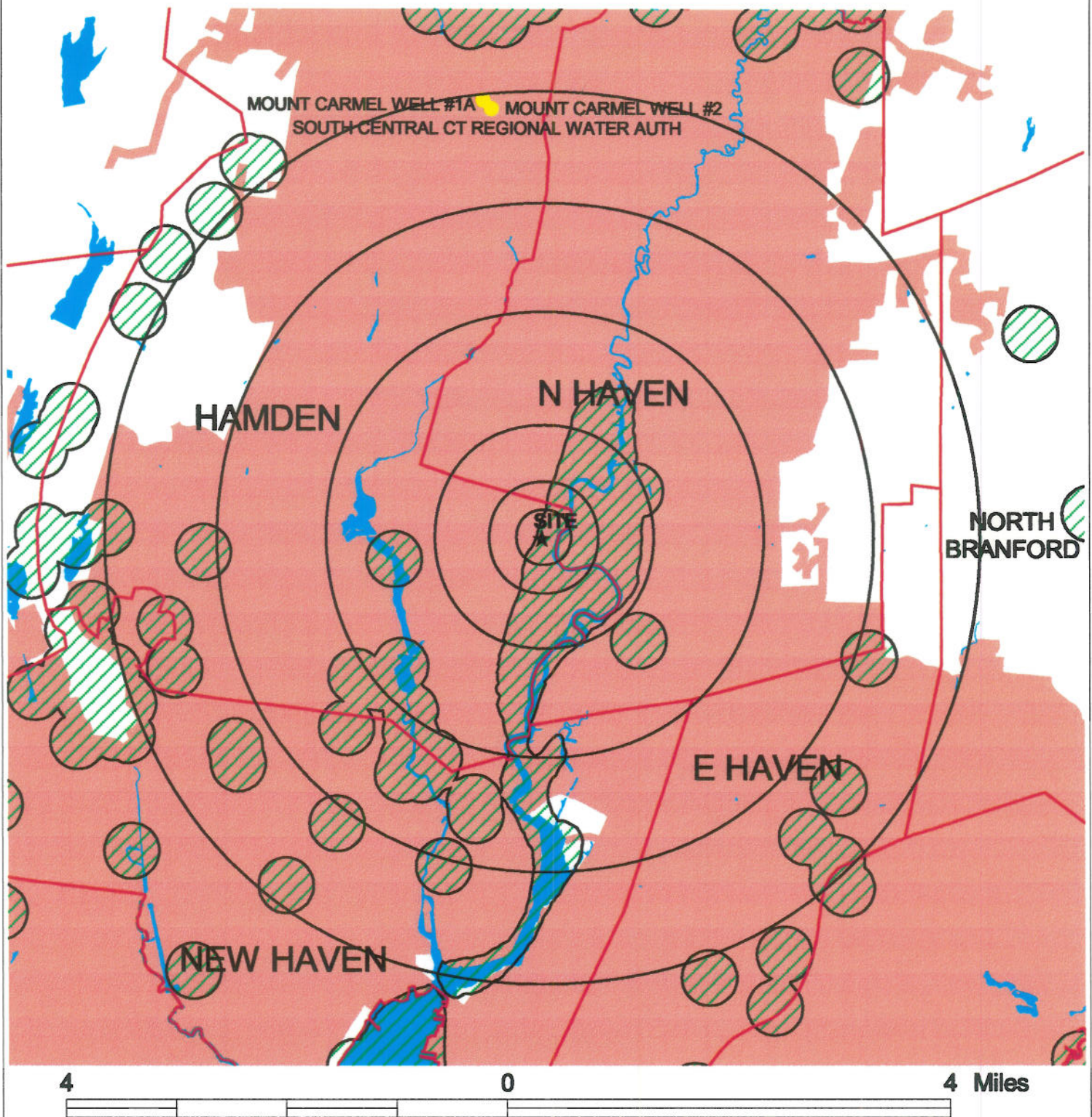


FIGURE 3- 4 MILE RADIUS

- Public Wells
- Natural Diversity Areas
- Streams
- Public Water Service Area

TABLE 4
PUBLIC WATER SUPPLY SOURCES WITHIN A FOUR MILE RADIUS
Landfill Associates, Hamden, CT

DISTANCE / DIRECTION (miles)	SOURCE NAME (standby wells)	LOCATION OF SOURCE	ESTIMATED POPULATION (if wells in service)
3.8 & 3.9/ N	SCCRWA Mount Carmel Wells #1 & 2	Hamden	11,248
Population Total			11,248

Table 5 lists estimated drinking water populations served by groundwater sources within four miles of Landfill Associates. The number of private well users are estimated through the use of GIS by determining the area of each town within each distance ring not supplied by public sources and multiplying by the US 1990 Census value for number of people/mile² in each town.

TABLE 5
ESTIMATED DRINKING WATER POPULATION SERVED BY GROUNDWATER SOURCES
WITHIN FOUR MILES
LANDFILL ASSOCIATES, HAMDEN, CT

RADIAL DISTANCE FROM THE SITE	ESTIMATED POPULATION SERVED BY PRIVATE WELLS	ESTIMATED POPULATION SERVED BY PUBLIC WELLS	TOTAL ESTIMATED POPULATION SERVED WITHIN THE RING
0.00 - 0.25	0	0	0
0.25 - 0.50	0	0	0
0.50 - 1.00	0	0	0
1.00 - 2.00	0	0	0
2.00 - 3.00	1,348	0	1,348
3.00 - 4.00	6,054	11,248	17,302
TOTALS	7,402	11,248	18,650

As part of the SIP groundwater samples were taken from the Landfill Associates monitor wells. Sample locations and rationale are given in Table 6 below (See Figure 2- Analytical Reports included in Appendix C):

TABLE 6
SAMPLE LOCATIONS/RATIONALES- GROUND WATER SAMPLES

SAMPLE ID	ANALYTICAL PARAMETERS	LOCATION / RATIONALE
GW-A	PHYS/CHEM, METALS, SVOCs, VOCs	MW-A / SITE HYDROLOGY IMPLIES DISCHARGE TO WETLAND
GW-B2	PHYS/CHEM, METALS, SVOCs, VOCs	MW-B2 / SITE HYDROLOGY IMPLIES DISCHARGE TO WETLAND
GW-C	PHYS/CHEM, METALS, SVOCs, VOCs	MW-C / SITE HYDROLOGY IMPLIES DISCHARGE TO WETLAND
GW-QP-D	PHYS/CHEM, METALS, SVOCs, VOCs	MW-QP-D / HISTORIC ACTIVITIES; PETROLEUM DETECTED
GW-QP-D-Dup	PHYS/CHEM, METALS, SVOCs, VOCs	DUPLICATE OF MW-QP-D
GW-QP-E	PHYS/CHEM, METALS, SVOCs, VOCs	MW-QP-E / HISTORIC ACTIVITIES
GW-8S	PHYS/CHEM, METALS, SVOCs, VOCs	MW-8S / BACKGROUND SAMPLE
GW-10S	PHYS/CHEM, METALS, SVOCs, VOCs	MW-10S / SITE HYDROLOGY IMPLIES DISCHARGE TO QUINN. RIVER

Table 7 provides a summary of those compounds/elements which were equal to or greater than three times the concentration detected in the background (Ref) sample, or if not detected in the background, equal to or greater than the background detection limit:

TABLE 7
SAMPLE RESULTS SUMMARY: Landfill Associates
Samples Collected by CT DEP on June 26, 1996

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
GW-A	SVOCs ug/l		
	Acenaphthylene	0.11	Detected
	Acenaphthene	0.06	Detected
	Diethyl Phthalate	0.57	1.46 × Ref
	Phenanthrene	0.14	Detected
	Anthracene	0.09	Detected

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	Fluoranthene	0.32	Detected
GW-A cont.	Benz(a)Anthracene	0.18	Detected
	Chrysene	0.20	Detected
	Benzo(b,k)Fluoranthene	0.31	Detected
	Benzo(a)Pyrene	0.21	Detected
	Indeno(1,2,3-cd)Pyrene	0.18	Detected
	Benzo(g,h,i)Perylene	0.18	Detected
	Diphenamid*	0.95	Detected
	INORGANICS mg/l		
	Sodium	500	3.8 × Ref
	Potassium	47	1.3 × Ref
GW-B2	VOCs ug/l		
	Methyl Ethyl Ketone	15	Detected
	SVOCs ug/l		
	Napthalene	0.16	Detected
	Phenanthrene	0.62	Detected
	Butyl Benzyl Phthalate	14	1.2 × Ref
	Diphenamid	1.6	Detected
	INORGANICS mg/l		
	Cadmium	0.06	1 × Ref
	Iron	2300	4.5 × Ref
	Sodium	220	1.7 × Ref
	Potassium	89	2.5 × Ref
GW-C	SVOCs ug/l		

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	Diphenamid	1.7	Detected
GW-C cont.	INORGANICS mg/l		
	Cadmium	0.06	1 × Ref
	Iron	3600	7.1 × Ref
	Manganese	17	1.2 × Ref
	Sodium	590	4.5 × Ref
	Potassium	120	3.3 × Ref
GW-10S	SVOCs ug/l		
	Phenanthrene	0.11	Detected
	Di-N Butyl Phthalate	3.0	1.9 × Ref
	INORGANICS mg/l		
	Sodium	200	1.5 × Ref
GW-QP-D	VOCs ug/l		
	Benzene	120	Detected
	Chlorobenzene	820	Detected
	1,2,4 Trimethylbenzene	20	Detected
	1,4 Dichlorobenzene	18	Detected
	Napthalene	40	Detected
	SVOCs ug/l		
	Acenaphthylene	0.54	Detected
	Acenaphthene	4.2	Detected
	Fluorene	2.7	Detected
	Phenanthrene	3.8	Detected
	Pyrene	1.7	1.2 × Ref

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	Benzo(a)Anthracene	0.77	Detected
	Chrysene	0.74	Detected
GW-QP-D cont.	Benzo(b,k)Fluoranthene	0.94	Detected
	Benzo(a)Pyrene	0.62	Detected
	Benzo(g,h,i)Perylene	0.37	Detected
	Diphenamid	1.2	Detected
	INORGANICS mg/l		
	Barium	1.1	1.2 × Ref
	Sodium	470	3.6 × Ref
	Potassium	47	1.3 × Ref
GW-QP-D Dup	VOCs ug/l		
	Benzene	110	Detected
	Chlorobenzene	760	Detected
	1,2,4 Trimethylbenzene	20	Detected
	1,4 Dichlorobenzene	17	Detected
	Napthalene	27	Detected
	SVOCs ug/l		
	Acenapthylene	0.44	Detected
	Acenapthene	4.0	Detected
	Fluorene	2.5	Detected
	Phenanthrene	3.2	Detected
	Anthracene	0.9	Detected
	Fluoranthene	1.2	Detected
	Benzo(a)Anthracene	0.36	Detected

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	Chrysene	0.43	Detected
	Benzo(b,k)Fluoranthene	0.48	Detected
	Benzo(a)Pyrene	0.3	Detected
GW-QP-D Dup cont.	Indeno(1,2,3-cd)Pyrene	0.18	Detected
	Benzo(g,h,i)Perylene	0.18	Detected
	Diphenamid	1.1	Detected
	INORGANICS mg/l		
	Barium	1.1	1.2 × Ref
	Sodium	450	3.4 × Ref
	Potassium	44	1.2 × Ref
GW-QP-E	SVOCs ug/l		
	Diphenamid	1.4	Detected
	INORGANICS mg/l		
	Sodium	1200	9.1 × Ref
	Potassium	58	1.6 × Ref

* Diphenamid- described as a pre-emergent herbicide. Not listed as a CERCLA hazardous substance

Sample results indicate that several ground water samples taken at various locations at the site were reported to contain several VOCs, SVOCs and inorganic substances which were detected or exceed reference values.

SURFACE WATER PATHWAY

Surface water drainage at the site is affected by the earthen berm which surrounds the site on the eastern and southern boundaries. No probable point of entry is identifiable. Infiltration of precipitation and subsequent discharge of contaminated groundwater is the most likely scenario for hazardous substances to enter the Quinnipiac River or Brick Yard Creek.

Brick Yard Creek originates 1,700 feet west of the Quinnipiac River. Numerous tidal drainage ditches lead from the southern toe of the landfill south to Brick Yard Creek (see Figure 2).

The Quinnipiac River flows southerly along the eastern boundary of the site approximately 2,000 feet until the confluence with Brick Yard Creek (see Figure 4- Target Distance Limit). The Quinnipiac River then flows approximately 5.8 miles to Long Island Sound. The surface water classification of the Quinnipiac is SB (description of classification given in Appendix). No known drinking water surface intakes are located in the 15 mile downstream surface water pathway. There is an estimated 8.2 miles of sensitive environment wetland frontage located along the 15 mile downstream surface water pathway from the Landfill Associates property (4).

The surface water bodies within the 15 mile downstream pathway, and the estimated flow rates are listed in Table 8 below:

TABLE 8
WATER BODIES WITHIN THE SURFACE WATER SEGMENT
Landfill Associates, Hamden, CT

SURFACE WATER BODY	DESCRIPTOR	LENGTH OF REACH (miles)	FLOW CHARACTERISTICS (cfs*)	LENGTH OF WETLANDS
Brick Yard Creek	Small to Moderate Stream	0.3	28 (8)	0.6
Quinnipiac River	Moderate to Large Stream	5.8	244	8.2
Long Island Sound	Coastal Tidal Waters	8.9	NA	0

*cfs = cubic feet per second

Sediment and surface water samples were collected from Brick Yard Creek and the Quinnipiac River on February 2, 1998 as part of the Site Inspection Prioritization. Sample locations and rationales are given in the below table (Analytical Reports included in Appendix C):

TABLE 9
Sample Locations/rationales- Sediment and Surface Water Samples
collected on February 2, 1998

SAMPLE ID	ANALYTICAL PARAMETERS	LOCATION / RATIONALE
SEDIMENT		
SD-01	METALS, SVOCs, VOCs	UPSTREAM LOCATION IN BRICKYARD CREEK / BACKGROUND SAMPLE
SD-02	METALS, SVOCs, VOCs	MIDSTREAM LOCATION IN BRICKYARD CREEK
SD-03	METALS, SVOCs, VOCs	TERMINUS OF BRICKYARD CREEK / DOWNSTREAM SAMPLE

LANDFILL ASSOCIATES SURFACE WATER PATHWAY

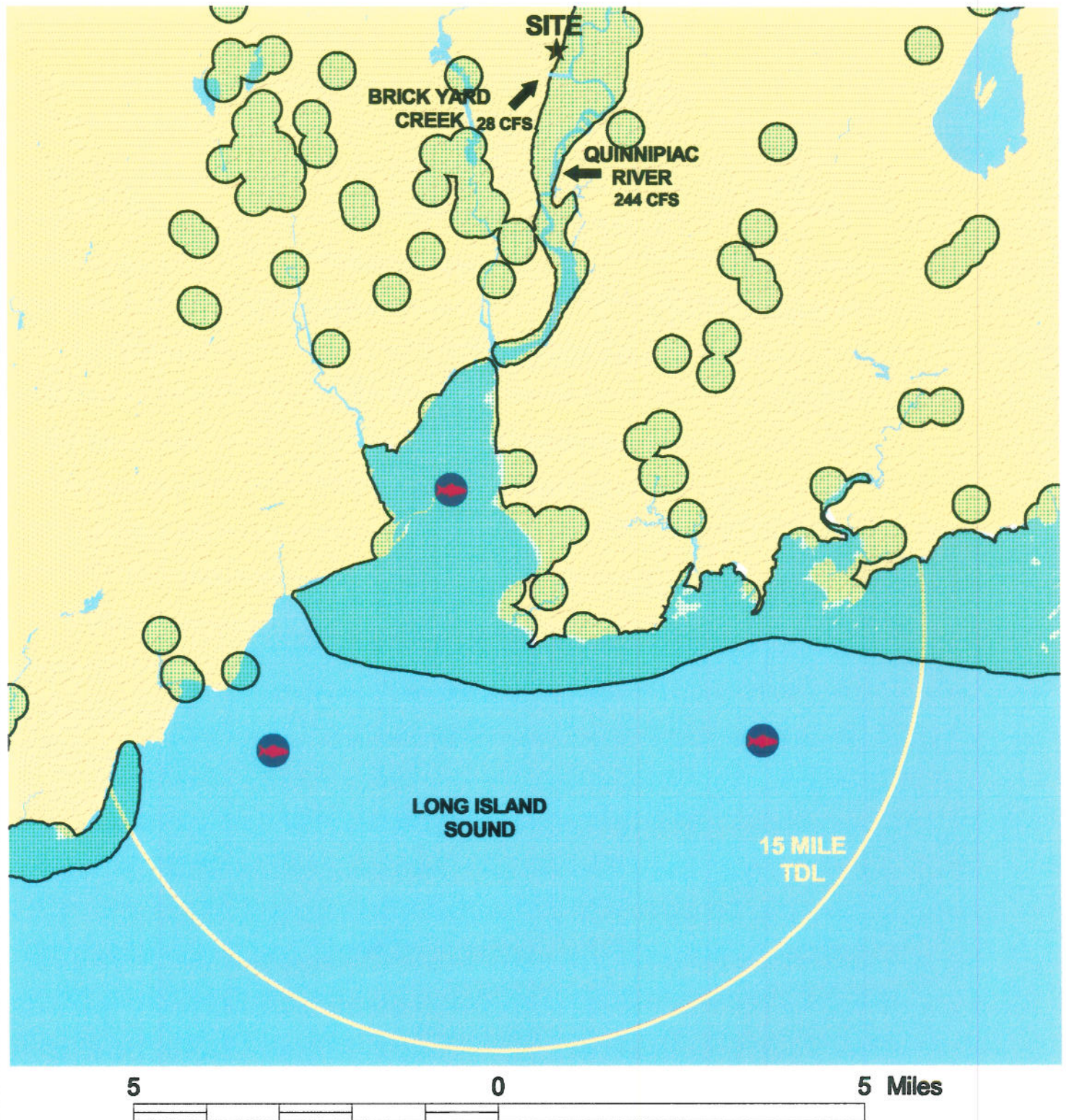


FIGURE 4
TARGET DISTANCE LIMIT
 Natural Diversity



SAMPLE ID	ANALYTICAL PARAMETERS	LOCATION / RATIONALE
SD-07A,B,C	METALS, SVOCs, VOCs	QUINNIPIAC RIVER NORTH OF SITE / BACKGROUND SAMPLE
SD-08	METALS, SVOCs, VOCs	QUINNIPIAC RIVER EAST OF SITE (ADJACENT)/ MIDSTREAM SAMPLE
SD-09	METALS, SVOCs, VOCs	QUINNIPIAC RIVER EAST OF SITE (ADJACENT) / MIDSTREAM SAMPLE
SD-10	METALS, SVOCs, VOCs	QUINNIPIAC RIVER SOUTH OF SITE / DOWNSTREAM SAMPLE
SURFACE WATER		
SW-01	PHYS/CHEM, METALS, SVOCs, VOCs	UPSTREAM LOCATION IN BRICKYARD CREEK
SW-03	PHYS/CHEM, METALS, SVOCs, VOCs	BRICKYARD CREEK / CONFLUENCE WITH QUINNIPIAC RIVER
SW-07	PHYS/CHEM, METALS, SVOCs, VOCs	QUINNIPIAC RIVER NORTH OF SITE / BACKGROUND SAMPLE
SW-10	PHYS/CHEM, METALS, SVOCs, VOCs	QUINNIPIAC RIVER SOUTH OF SITE / DOWNSTREAM SAMPLE

Due to the variability of sediment samples, three sediment samples were obtained from the same location (SD-07) for a representative background sample. The mean value of the analytical results are used as the reference value. A summary of the sampling data is given below:

Table 10
SAMPLE RESULTS SUMMARY: Landfill Associates
Samples Collected by CT DEP on February 2, 1998

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
SEDIMENT			
SD-01	VOCs ug/kg		
	Benzene	3.8	Detected
	Toluene	23	2.2 × Ref
	Chlorobenzene	5	Detected
	1,2 Dichlorobenzene	20	Detected
	SVOCs ug/kg		
	Fluoranthene	100	Detected
	Pyrene	100	Detected
SD-02	INORGANICS mg/kg		
	Nickel	160	1.5 × Ref
	Zinc	890	1.1 × Ref

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	Selenium	0.3	1.0 × Ref
SD-03	VOCs ug/kg		
	MTBE	35	1.7 × Ref
SD-10	SVOCs ug/kg		
	Fluoranthene	140	Detected
	Pyrene	140	Detected
	Chrysene	70	Detected
SURFACE WATER			
SW-01	VOCs ug/l		
	MTBE	20	1.7 × Ref
	Toluene	6.0	Detected
	m,p Xylene	2.0	Detected
	INORGANICS mg/l		
	Nickel	0.02	Detected
SW-03	VOCs ug/l		
	MTBE	85	7.3 × Ref
	Benzene	3.0	Detected
	Toluene	19	Detected
	Ethyl Benzene	2.2	Detected
	m,p Xylene	6.1	Detected
	o Xylene	3.0	Detected
	1,3,5 Trimethylbenzene	1.1	Detected
	1,2,4 Trimethylbenzene	1.1	Detected
	Napthalene	1.8	Detected
SW-10	VOCs ug/l		

SAMPLE ID	COMPOUND/ ELEMENT	CONCENTRATION	COMMENTS
	cis 1,2 Dichloroethene	1.3	Detected

Sampling results indicate several sediment samples with reported levels of VOCs, SVOCs and inorganic substances detected or exceeding reference values. Surface water samples were reported to contain several VOCs detected or exceeding reference values.

SOIL EXPOSURE PATHWAY

There are no onsite residents at the Landfill Associates site. The number of workers at the site is estimated to be 10 including office staff. The nearest residence is located approximately 750 feet west of the site. An estimated 3,097 people live within one radial mile of the site (4). There are no known schools or day care facilities within 200 feet of the identified source area on the Landfill Associates property (i.e. 39 acre filled area). The southern end of the property includes a brackish intertidal marsh, a significant natural community (9). There are no known endangered or threatened species on the site. While the western boundary of the site is fenced (active rail corridor), other pedestrian and vehicular access to the site is not restricted.

The total population within 4 miles was estimated through the use of GIS by determining the inhabited area of each town within each distance ring and multiplying by the US 1990 Census value for number of people/mile² in each respective town.

TABLE 12
TOTAL POPULATION WITHIN A FOUR MILE RADIUS
of Landfill Associates, Hamden, CT

RADIUS (miles)	POPULATION
On-site	10
0.00 - 0.25	320
0.25 - 0.50	534
0.50 - 1.00	2,243
1.00 - 2.00	42,213
2.00 - 3.00	37,668
3.00 - 4.00	61,250

RADIUS (miles)	POPULATION
TOTAL	144,228

Q-Group accumulated 200 piles of bulky waste shredder fines on the surface of the landfill. Tests performed on the fines revealed that the fines contained asbestos or asbestos-containing material (ACM) ranging from 1% to 5%. At least one half foot of clean cover material has been applied to areas where ACM had been located.

AIR PATHWAY

There has been no direct observation or chemical analysis performed that demonstrates an observed release to the air pathway. The DEP Air Management Bureau staff have conducted air sampling at the site and surrounding areas for asbestos; however, no data supporting an observed release was obtained (see Appendix D). The nearest individual, or person(s) closest to any source onsite are the estimated 10 employees. There is an estimated population of 144,288 persons living within a four mile radius of the site (4).

There are several Connecticut endangered and species of concern within four radial miles of the site listed in Table 11 below (9). There are approximately 1,205 acres of brackish intertidal marsh wetlands within the same area.

TABLE 13
SENSITIVE ENVIRONMENTS WITHIN FOUR MILES
of Landfill Associates, Hamden, CT

Species/Communities within 1/4 mile:

NONE

Species/Communities within 1/2 mile:

BRACKISH INTERTIDAL MARSH

1986

Species/Communities within 1 mile:

Landfill Associates

December 1, 1998

PASSERCULUS SANDWICHENSIS
RANUNCULUS SCELERATUS
CAREX POLYMORPHA
CHRYSOPTERIS FALCATA

Savannah Sparrow
Cursed Crowfoot
Variable Sedge
Sickle-leaved Golden Aster

1913 SC
1987 SC
1878-06 E
1996-09-16 E

Species/Communities within 2 miles:

CRASSULA AQUATICA
ERIOCAULON PARKERI
MUHLENBERGIA CAPILLARIS

Pygmyweed
Parker's Pipewort
Long-awn Hairgrass

1899-07-17 SC
1942-08-23 E
1874-10 E

Species/Communities within 3 miles:

SPOROBOLUS HETEROLEPIS
FRESHWATER TIDAL MARSH
LIMOSELLA SUBULATA
CAREX VIRIDULA
SPOROBOLUS HETEROLEPIS
SPOROBOLUS HETEROLEPIS
PHASEOLUS POLYSTACHIOS VAR AQUILONI

Northern Dropseed

Mudwort
Little Green Sedge
Northern Dropseed
Northern Dropseed
Wild Kidney Bean

1938-09-08 E
1987
1985-08 SC
1896-06-04 E
1976-09-21 E
1988-10-27 E
1942-08-23 SC

Species/Communities within 4 miles:

RUBUS CUNEIFOLIUS
PANICUM VERRUCOSUM
AMBYSTOMA JEFFERSONIANUM
MUHLENBERGIA CAPILLARIS
ARETHUSA BULBOSA
VIBURNUM NUDUM
LEPIPOLYS PERSCRIPTA
ASCLEPIAS VIRIDIFLORA
CAREX VIRIDULA

Sand Bramble
Warty Panic Grass
Jefferson Salamander
Long-awn Hairgrass
Arethusa
Possum Haw
Scribbled Sallow
Green Milkweed
Little Green Sedge

1995-06-16 SC
1886-09-22 SC
1956 SC
1880-09-20 E
1900-06 E
1886-06-03 SC
1981 SC
1942-05-23 SC
1882-08-07 E

**TABLE 14
WETLANDS WITHIN FOUR MILES
of Landfill Associates, Hamden, CT**

Radial Distance from Landfill Associates (miles)	Significant Wetlands
0 < 1/4	26.8 acres wetlands
1/4 < 1/2	196.6 acres wetlands
1/2 < 1	536.7 acres wetlands
1 < 2	345.3 acres wetlands
2 < 3	99.4 acres wetlands
3 < 4	0

SUMMARY

The Landfill Associates site is located at 2891 State Street (Route 5) in Hamden, CT (see Figure 1- Location Map). The site consists of two parcels of land owned by Mr. Joseph J. Farricielli and identified by the Hamden Tax Assessor as parcel A (Map 2332, Lot 014) and parcel C (Map 2432, Lot 020) with a total acreage of approximately 76 acres. The most recent permitted landfill operation on site was Q Park Landfill (operated by Quinnipiac Group, Inc. (Q-Group) under permit #SW-0620250), a solid waste disposal area which was permitted to accept bulky wastes on approximately 26 acres of the site.

Inspections of the bulky waste disposal operation performed at various times revealed that unauthorized disposal of small quantities of hazardous substances had occurred on site. Analyses of this waste indicated the presence of inorganic elements, acids, volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

Prior to September 1996, Q-Group accumulated 200 piles of bulky waste shredder fines on the surface of the landfill. Tests performed on the fines revealed that the fines contained asbestos or asbestos-containing material (ACM) ranging from 1% to 5%. At least one half foot of cover has been applied to the areas of the landfill where ACM materials had been present at the surface.

Landfill operations are currently being conducted by the owner, Mr. Farricielli, without a permit to operate a solid waste disposal area. Further enforcement actions are being pursued by the DEP Waste Management Bureau.

There are no drinking water wells located on-site. The South Central Regional Water Authority provides potable water in the vicinity of the site. The nearest residential drinking water well is estimated to be located approximately 2.25 miles east of the site in the town of North Haven. The South Central Connecticut Regional Water Authority (SCCRWA) distributes drinking water to 383,623 customers in the greater New Haven area. SCCRWA owns two wells constructed in overburden, identified as Mount Carmel Wells #1A and #2, located 3.8 and 3.9 miles north of the site respectively (see Figure 3- Four Mile Target Radius).

As part of the SIP groundwater samples were taken from the Landfill Associates monitor wells. Sample results indicate that several ground water samples taken at various locations at the site were reported to contain several VOCs, SVOCs and inorganic substances which were detected or exceed reference values.

No probable point of entry to the surface water pathway is identifiable. Infiltration of precipitation and subsequent discharge of contaminated groundwater is the most likely scenario for hazardous substances to enter the Quinnipiac River or Brick Yard Creek.

Brick Yard Creek originates 1,700 feet west of the Quinnipiac River. Numerous tidal drainage ditches lead from the southern toe of the landfill south to Brick Yard Creek (see Figure 2). The Quinnipiac River flows southerly along the eastern boundary of the site approximately 2,000 feet until the confluence with Brick Yard Creek (see Figure 4- Target Distance Limit). The Quinnipiac River then flows approximately 5.8 miles to Long Island Sound. No known drinking water surface intakes are located in the 15 mile downstream surface water pathway. There is an estimated 8.2 miles of sensitive environment wetland frontage located along the 15 mile downstream surface water pathway from the Landfill Associates property.

Sampling results indicate several sediment samples with reported levels of VOCs, SVOCs and inorganic substances detected or exceeding reference values. Surface water samples were reported to contain several VOCs detected or exceeding reference values.

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There has been no direct observation or chemical analysis performed that demonstrate an observed release to the air pathway. The DEP Air Management Bureau staff have conducted air sampling at the site and surrounding areas for asbestos; however, no data supporting an observed release was obtained. The nearest individual, or person(s) closest to any source onsite are the estimated 10 employees. There is an estimated population of 144,288 persons living within a four mile radius of the site.

There are several Connecticut endangered and species of concern within four radial miles of the site. There are approximately 1,205 acres of brackish intertidal marsh wetlands within the same area.

REFERENCES

- 1) NUS/FIT. 1991. Final SSI Landfill Associates Hamden, CT. August 20.
- 2) Botti Jr., T. R. 1996. Hamden Town Hall Record Search. June.
- 3) CT DEP Agency File Information.
- 4) CT DEP GIS. Source material compiled from various State and Federal Agency sources.
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- 7) SCCRWA. 1997. Water Supply Plan. August 1997
- 8) Marin Environmental. 1995. Q Park Landfill Annual Report. December 1995.
- 9) Kingsbury, Stacey. 1998. Natural Diversity Database Memo. July 31, 1998.